Yang Miao

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Educational Background

09/2021-	Master in Robotics, System and Control, ETH Zurich, GPA **5.83**/6
2016-2020	B.Eng. in E.E. and Automation, Harbin Institute of Technology, GPA 96.9/100 (**Top 1/289**)
2019	Visiting student, University of California, Berkeley, GPA **4.0**/4.0

Research Experiences

11/2023-   Visual Localization to 3D Scene Graph   Research Assistant
Keywords: **Cross-modal localization; 3D scene graph; Multi-modal embedding; Contrastive Learning;**
Supervisor: **Dr. Dániel Béla Baráth, Dr. Francis Engelmann, Dr. Olga Vysotska** at CVG Lab, ETHZ

1. **Publication**: video. Code and preprint will be released soon (under review).
2. Proposed a novel challenge of cross-modal localization of a query image within 3D scene graphs.
3. Leveraged multiple modalities of scene graph (object-level point cloud, image, attributes and relationship between objects) for object embedding in the scene graph.
4. Contrastive learning for a shared embedding space for objects in query images and in 3D scene graph.

10/2022-10/2023   Panoptic SLAM with Semantic and Geometric Consistency   Master Thesis
Keywords: **3D panoptic mapping; semantic-aided localization**; C++; python; ROS; PyTorch
Supervisor: **Dr. Iro Armeni, Dr. Dániel Béla Baráth, Prof. Dr. Marc Pollefeys** at CVG Lab, ETHZ
Phase 1: Incremental Panoptic Mapping

1. **Publication:** arXiv, video, code(submitted to IROS 2024)
2. Developed algorithms which incrementally builds 3D panoptic map with RGB-D frames;
3. **Outperforms** existing 2D-3D semantic-instance mapping method with estimated trajectory.

Phase 2: Semantic-aided Localization (transferred to next project)

1. Improved ORB-SLAM3 and Voxgraph with panoptic information.
2. Explored semantic-aided with panoptic information, which led to "Visual Localization to 3D Scene Graph".

04/2022-10/2022   Visual Odometry with New Unprecedented Event Camera (github)   Research Assistant
Keywords: **visual odometry; event camera; feature tracking; ROS; C++; Ceres**
Supervisor: **Nico Messikommer, Daniel Gehrig, Prof. Dr. Davide Scaramuzza** at RPG Lab, UZH

1. Developed feature tracking algorithms for new event camera with events with absolute intensity value.
2. **Outperforms** existing methods.
3. Grants Oculi sensor (low resolution) feature tracking accuracy **comparable to** Realsense(high resolution).

02/2022-06/2022   Automatic large-scale 3D data acquisition   Research Assistant
Keywords: **Autonomous Exploration; 3D Reconstruction; NeRF; C++; ROS; PyTorch**
Supervisor: **Prof. Dr. Fisher Yu, Dr. Kumar** at Visual Intelligence and Systems Lab, ETHZ

1. Developed an algorithm allowing robot to automatically collect large-scale 3D RGB-D and Lidar data.
2. Employed depth-supervised NeRF to reconstruct the 3D scene.

Industry Research Experiences

06/2020-06/2021   3D Computer Vision for Automation of Port Operations   Research Assistant
Keyword: **Pointclouds Processing with Lidar; Pattern Recognition; Pose Estimation; ROS; C++**
Supervisor: **Prof. Zhan Li** - Intelligent Control Lab, Harbin Institute of Technology

1. **Publication**: Y. Miao et al, "A Novel Algorithm of Ship Structure Modeling and Target Identification Based on Point Cloud for Automation in Bulk Cargo Terminals," *Measurement and Control 2021* (PDF)
2. Developed and **deployed** a system for hatch recognition and pose estimation of cargo ships at **Tianjin Port**.